



# Mike Horse Messenger

## Special Edition: Proposed Plan

October 2015

### What is the Proposed Plan?

The DEQ has prepared a Proposed Plan to identify its preferred final remedy for completing cleanup activities on non-federal lands at the UBMC Comprehensive Environmental Cleanup and Responsibility Act (CECRA – State Superfund) Facility in Lewis and Clark County, Montana. The Proposed Plan identifies and explains DEQ's preferred alternative for addressing releases and threatened releases of heavy metals into the environment that may present an imminent and substantial threat to public health, safety, or welfare or to the environment. The Proposed Plan also summarizes the cleanup options (alternatives) evaluated for the non-federal portions of the UBMC. DEQ will select the final remedy for the non-federal lands at the UBMC and present it in a Record of Decision (ROD) after reviewing and considering relevant information, including but not limited to comments submitted during the public comment period on the Proposed Plan. DEQ may modify the preferred remedy or select another remedy if DEQ determines a different remedy is more appropriate.

The USFS is responsible for selecting the remediation on the National Forest System (federal) lands within the UBMC. In July 2007, the USFS released its Action Memorandum identifying the required cleanup at a portion of its property within the UBMC. The USFS amended that Action Memorandum in July 2012. DEQ's Proposed Plan does not address any of the federal lands within the UBMC for which the USFS already selected a cleanup. For those federal lands within the UBMC that were not included in the Action Memorandum, as amended, the USFS will issue a separate decision. This Proposed Plan discussed in this fact sheet identifies DEQ's preferred remedy for the non-federal land within the UBMC.

### For More Information on the Proposed Plan:

David Bowers  
Project Officer  
DEQ  
(406) 444-6335  
[dbowers@mt.gov](mailto:dbowers@mt.gov)

### To be added to the mailing list contact:

Jeni Flatow  
Public Information Officer DEQ  
(406) 444-6469  
[jflatow@mt.gov](mailto:jflatow@mt.gov)

**Website:** <http://www.deq.mt.gov/StateSuperfund/UBMC/default.mcp>

**Where can you find the Proposed Plan?**

Montana Department of Environmental Quality  
1225 Cedar Street  
Helena, MT 59601  
406-444-6444

Business Hours: Monday – Friday: 8 am – 5 pm

Lincoln Ranger District  
1569 Highway 200  
Lincoln, MT 59639  
406-362-7000

Business Hours: Monday – Friday: 8 am – 5 pm

Lincoln Library (Lewis and Clark Library Branch)  
102 9<sup>th</sup> Street  
Lincoln, MT 59639  
406-362-4300

Business Hours: Sunday – Friday (hours vary);  
Closed Saturday

Lewis and Clark County Library  
120 S. Last Chance Gulch  
Helena, MT 59601  
406-447-1690

Business Hours: Sunday – Saturday (hours vary)

DEQ's website: <http://deq.mt.gov/StateSuperfund/UBMC/default.mcpix>.

**Background**

The UBMC is located approximately 15 miles east of Lincoln, Montana, in the headwaters area of the upper Blackfoot River and covers an area of approximately six square miles. The UBMC includes a number of individual historical underground mines, with the Mike Horse Mine being the largest.

Historical mining activity at the UBMC resulted in hard-rock mining wastes and acidic discharges. Human health and environmental issues are caused by elevated levels of metals present in mine waste piles, tailings, surface water, groundwater, sediments, water discharging from mine adits, and contaminated waste redeposited as stream sediments. The Mike Horse Tailings Impoundment was a significant source of contaminated waste redeposited as stream sediments. The impoundment was constructed on the Beartrap Creek drainage in 1941 for disposal of tailings from the Mike Horse Mine mill. In June 1975, heavy precipitation, along with blockage of a surface water diversion ditch by mudslide debris, caused the impoundment to be breached. As a result, approximately 200,000 cubic yards of tailings were washed downstream and deposited on the Beartrap Creek and Upper Blackfoot River floodplain. Numerous investigations have been conducted to characterize contamination in mine wastes. Contaminants at the UBMC include, but are not limited to, aluminum, arsenic, cadmium, copper, lead, iron, manganese, and zinc.

Numerous interim actions, described in the Proposed Plan, were conducted to address some of the contamination from historical mining activities at the UBMC and to meet various permit requirements. From 1993 through 1997, mine waste piles associated with various UBMC mines were removed and placed in engineered repositories. Other interim actions at the various UBMC mines included filling two mine shafts, plugging several mine adits, and treating mine waste in place.

## Risk Assessment

DEQ evaluated risks to humans and wildlife in the baseline human health risk assessment (HHRA) and baseline ecological risk assessment (BERA) to determine if there was any unacceptable risk for current or potential future uses. The HHRA and BERA identified contaminants of concern (COCs), exposure pathways, exposure assumptions, toxicity values, and calculated site-specific cleanup levels (SSCLs) for the COCs.

Thirteen separate areas (exposure units, or EUs) were identified for the UBMC risk assessments based on physical location, habitat type, and waste sources, as presented in the figure on page 4.

In addition, the HHRA compared contaminant concentrations in groundwater and surface water with DEQ-7 numeric water quality standards for protection of human health. The BERA compared concentrations in surface water with DEQ-7 numeric water quality standards for protection of aquatic life. For those compounds in groundwater and surface water for which no DEQ-7 standard exists (aluminum, iron, and manganese), DEQ calculated SSCLs or used background concentrations.

Based upon these evaluations, DEQ determined that the COC concentrations in surface soil, subsurface soil, sediment, surface water, and groundwater at the UBMC represent unacceptable risks to human health and the environment, and that cleanup is necessary.

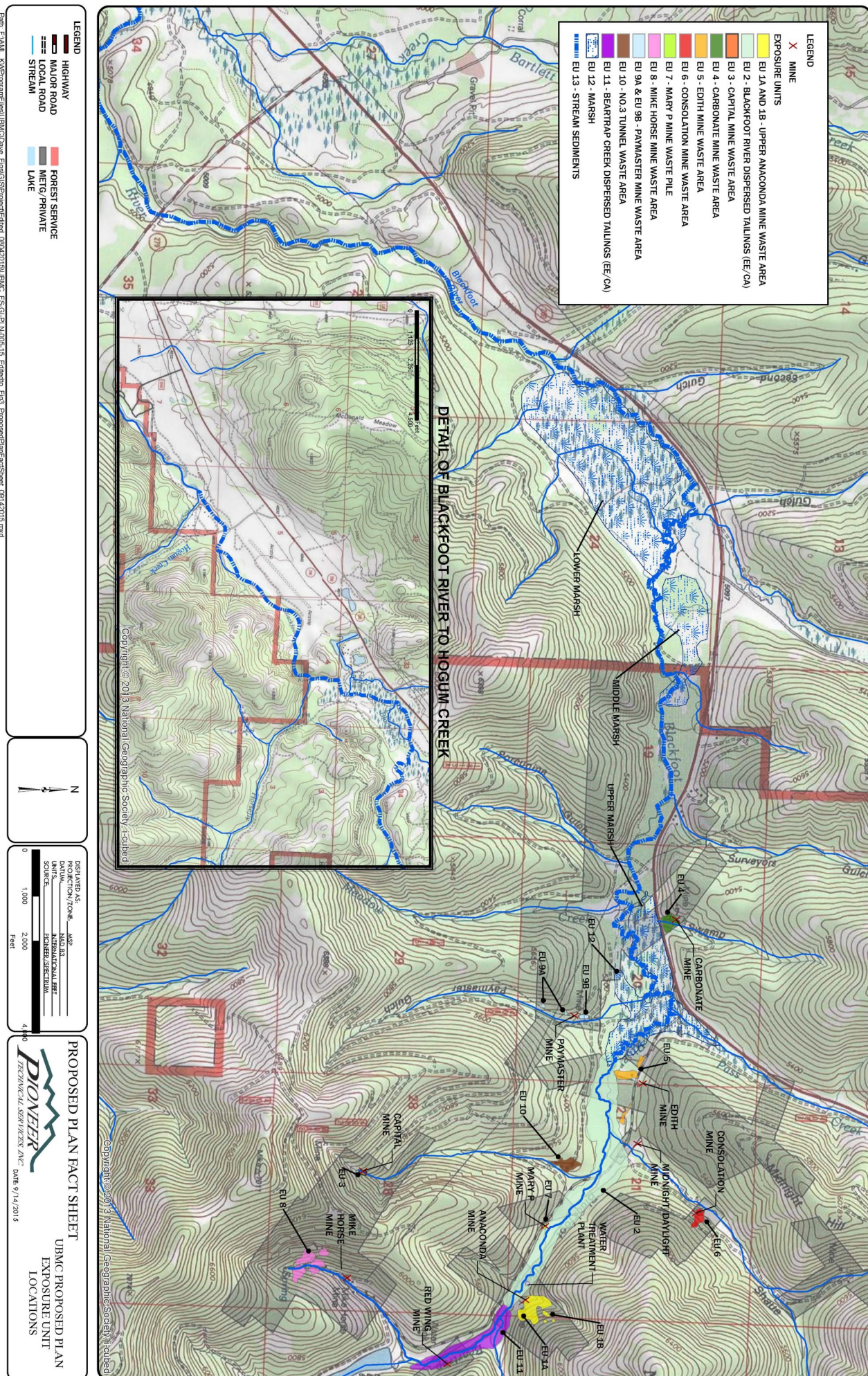
## Evaluating the Cleanup Options

The EUs were combined into five Evaluation Areas (EAs) to streamline the development of remedial action alternatives in the feasibility study. The EAs and the affected media are defined as follows:

- Evaluation Area 1 (EA 1) – Upland Waste Areas (soil)
- Evaluation Area 2 (EA 2) – Groundwater
- Evaluation Area 3 (EA 3) – Streams (sediment and surface water)
- Evaluation Area 4 (EA 4) – Upper Marsh (sediment and water)
- Evaluation Area 5 (EA 5) – Mining-related Features (exploratory adits, drill pads, etc.)

Fifteen alternatives were evaluated and compared against the seven cleanup criteria provided in Montana law (Section 75-10-721, MCA). The remedial alternatives were sorted by solid media (which includes soil, sediment, and physical hazards) and liquid media (which includes groundwater and surface water). Screening of these alternatives resulted in one baseline alternative (no action) that may be applied to both solid and liquid media, seven alternatives for solid media, and seven alternatives for liquid media. All remedial alternatives, except for no action, also include common elements comprised of institutional controls (ICs), engineering controls, and long-term monitoring and maintenance. A list of the alternatives, a brief description, and their corresponding numbers starts on page 5.







**Solid Media and Liquid Media**

Alternative 1: No Action – All identified contamination remains at the UBMC and continues to impact soil, groundwater and surface water quality, and environmental receptors. This alternative applies to all EAs.

**Solid Media**

Alternative 2: Monitored Natural Recovery (MNR) – Uses naturally occurring processes, along with source removal, to reduce contaminant concentrations in sediment over time. This alternative applies to EA 3 and EA 4.

Alternative 3: Physical Barriers – Adit openings or related physical safety hazards associated with mining-related features would be closed using a physical barrier to prevent human entry. This alternative applies to EA 5.

Alternative 4: Containment – Solid media (soil and marsh sediment) would be contained by covering with soil or rock and establishing vegetated cover where soil is used to eliminate risk of direct exposure, reduce sediment migration and limit water infiltration. This alternative applies to EA 1, EA 4, and EA 5.

Alternative 5: Removal and On-site Disposal – All solid media (soil and sediment) exceeding the SSCLs would be removed, transported, and disposed of at an engineered on-site repository. This alternative applies to EA 1, EA 3, EA 4, and EA 5.

Alternative 6: Removal and Off-site Disposal – All solid media (soil and sediment) exceeding the SSCLs would be removed, transported, and disposed of at an engineered off-site repository. This alternative applies to EA 1, EA 3, EA 4, and EA 5.

Alternative 7: In Situ Neutralization with Alkaline Amendment – All solid media exceeding the SSCLs would remain in place, but the pH of the soil would be increased through the application of lime, and the mobility and bio-availability of metals within the soil reduced. This alternative applies to EA 1 and EA 5.

Alternative 8: Ex Situ Neutralization with Alkaline Amendment – All soil exceeding the SSCLs would be excavated, mixed with lime, and returned to the original excavation site. This alternative applies to EA 1 and EA 5.

**Liquid Media**

Alternative 9: Monitored Natural Attenuation (MNA) – Uses natural processes, along with source removal, to reduce contaminant concentrations in groundwater over time. This alternative applies to EA 2 and EA 4.

Alternative 10: Containment (Retention Pond) – Seeps and springs would be captured and allowed to evaporate and infiltrate in a retention pond. This alternative applies to EA 3.

Alternative 11: Hydrologic and Hydraulic Control – Clean upgradient groundwater and surface water is captured and diverted around waste removal areas. This alternative applies to EA 2.

Alternative 12: Inundation (Groundwater in Mine Workings) – A bulkhead/wet mine seal or plug is installed at the entrance to a mine to raise the water level within the mine workings to reduce acid mine drainage through the reduction of oxygen available to the ore body. This alternative applies to EA 2.

Alternative 13: Active Chemical Reagent – Adds a neutralizing agent, such as lime (calcium oxide or calcium hydroxide) to impacted water, followed by a settling pond for metals precipitation. This alternative applies to EA 2.

Alternative 14: Active Physical/Mechanical Treatment – Uses ceramic microfiltration to filter contaminants out of the water by pumping through a ceramic membrane. This alternative applies to EA 2.

Alternative 15: Passive Chemical Reagent: Permeable Reactive Barrier (PRB) – Install a PRB and cut-off wall to remove metals from contaminated groundwater. This alternative applies to EA 2 should future monitoring show a potential for near-surface groundwater contamination of affect the Blackfoot River.

## The Preferred Cleanup

For those non-federal lands within the UBMC, DEQ selected a combination of alternatives to address physical hazards and cleanup soil, sediment, groundwater, and surface water. These include physical barriers for adit openings or related physical hazards in EA5; removal and on-site disposal of impacted soil and sediment in EAs 1, 3, 4 and 5; containment of impacted soil in EA1; MNR for sediments in EAs 3, 4, and 5; MNA for the groundwater in EA4; containment of some adit discharges, seeps, and springs in EA3; hydrologic and hydraulic control for upgradient groundwater and surface water combined with passive chemical reagent: PRB for groundwater in EA2; inundation for adit seepage control in EA2; active chemical reagent combined with active physical/mechanical treatment to address adit discharge in EA2; and no action for some locations in EA1. Common elements will be implemented, including ICs, engineering controls/access restrictions (fencing and/or warning signs), and long-term monitoring and maintenance. Interim actions that have been effective and meet regulatory criteria are also proposed for inclusion as part of the final remedy and include the Carbonate and Paymaster repositories, the Capital Mine adit plug, and the water treatment plant (WTP). The Mike Horse repository, an interim action that was found to be ineffective, has been removed concurrently with the removal of the Mike Horse Tailings Impoundment that is located on federal lands. The total cost for the preferred remedy, including the site-wide elements, is \$14,559,601. This cost does not include federal land cleanup costs. Actual costs and cleanup timeframes may vary and cost estimates will be further refined during remedial design. See preferred alternatives on page 7.

Based on the information available at this time, the preferred cleanup is protective of public health, safety, and welfare and of the environment, would comply with applicable or relevant environmental requirements, criteria and limitations, would reduce risk, would be effective in the short- and long-term, is practicable and implementable, uses some treatment and resource recovery technologies, and is cost-effective. The preferred remedy may be revised in response to public comment or new information. DEQ's final remedy decision for the non-federal land at the UBMC will be documented in the ROD.

## Public Involvement

Public involvement is an important part of the Superfund process and DEQ encourages public comment on the Proposed Plan. The public comment period for the Proposed Plan will extend for 30 days, from October 10, 2015 to 11:59 pm MST (Mountain Standard Time), on November 9, 2015. DEQ will accept verbal comments following its public meeting on October 28, 2015, at 7:00 pm at the Lincoln Community Hall, 404 Main St. in Lincoln, Montana. Comments received through the U.S. Postal Service must be postmarked no later than November 9, 2015, and comments submitted electronically must be received no later than 11:59 pm MST on November 9, 2015. During this time, the public can submit written comments on DEQ's Proposed Plan to:

David Bowers  
DEQ-Remediation Division  
P.O. Box 200901  
Helena, MT 59620-0901  
dbowers@mt.gov

Verbal comments will not be accepted over the phone; however, you may call David Bowers for additional information at 406-444-6335 or 1-800-246-8198. A responsiveness summary, which is a written response to all public comments received on DEQ's Proposed Plan during the public comment period, will be included in the ROD.

<b>Preferred Alternatives for Each Evaluation Area at the UBMC</b>					
<b>Alternatives</b>	<b>Evaluation Area 1 (EA 1) - Upland Waste Areas (soil)</b>	<b>Evaluation Area 2 (EA 2) - Groundwater</b>	<b>Evaluation Area 3 (EA 3) - Streams (sediment and surface water)</b>	<b>Evaluation Area 4 (EA 4) - Upper Marsh (sediment and water)</b>	<b>Evaluation Area 5 (EA 5) - Mining- related Features</b>
<b>(1) No Action</b>	EU5 and EU9A				
<b>(2) Monitored Natural Recovery - MNR</b>			Blackfoot River (EU13), Upper Marsh (EU12), Un-named Tributary (EU1), and Stevens Creek	Upper Marsh (EU12) - Western Portion	
<b>(3) Physical Barriers</b>					Mining-related Feature PC-01
<b>(4) Containment (earthen/rock cap)</b>	Portions of EU8				
<b>(5) Removal &amp; Onsite Disposal</b>	EU4, EU6, portion of EU7, and portion of EU8		Paymaster Creek (EU9)	Upper Marsh (EU12) - Eastern Portion	Mining-related Features BR-14, BR- 39, PM-04, SH-13, and SH-29
<b>(9) Monitored Natural Attenuation - MNA</b>				Upper Marsh (EU12) - East and West	
<b>(10) Containment (Retention Pond)</b>			Paymaster Adit (EU9)		
<b>(11) Hydrologic and Hydraulic Control</b>		Carbonate (EU4) Surface Water and Groundwater			
<b>(13) Active Chemical Reagent</b>		Mike Horse (EU8) and Anaconda (EU1) Adits			
<b>(14) Active Physical or Mechanical Treatment</b>		Mike Horse (EU8) and Anaconda (EU1) Adits			
<b>(15) Permeable Reactive Barrier - PRB</b>		Carbonate (EU4) Groundwater PRB			
<b>Site-wide Elements</b>	EU1A, EU1B, and EU3 (Access Restrictions)	Carbonate (EU4), Paymaster (EU9), and Mike Horse (EU8) - Groundwater ICs		Upper Marsh (EU12) - East and West (Access Restrictions and ICs)	Mining-related Features (18 Remote Features)

## DEQ Seeking Public Comment

The Montana Department of Environmental Quality (DEQ), the United States Forest Service (USFS), and the Montana Department of Justice Natural Resource Damage Program (NRDP) have been working together on the cleanup of the Upper Blackfoot Mining Complex (UBMC), also known as the Mike Horse, in Lewis and Clark County, Montana. The complex includes a mixture of federal and private lands that lie within a portion of the historic Heddleston Metal Mining District in the headwaters of the upper Blackfoot River. Over the past three years, cleanup at the Mike Horse tailings impoundment has been occurring. Because of the intermingling of federal and private lands, various cleanup decisions have needed to take place. The Proposed Plan, written by DEQ, will be released October 9 and will address cleanup on non-federal land within the UBMC. Simultaneously, the USFS has been working on a Technical Memorandum to address the remaining federal land within the UBMC. Together, these will address the remaining pieces of the cleanup. This update will lay out the DEQ Proposed Plan and the cleanup alternatives on non-federal land at the UBMC. The public is invited to comment on the Proposed Plan.

### Public Meeting

**Date:** October 28, 2015

**Time:** 7:00 P.M.

**Location:** Lincoln Community Hall, 404 Main St. in Lincoln, Montana

**Purpose:** To provide information and accept public comment on DEQ's Proposed Plan.

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WE WANT YOUR  
INPUT  
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Remediation Division  
P.O. Box 200901  
Helena, MT 59620

Name  
Address  
City, State, Zip